

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

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| Applicant's or agent's file reference ABC/20660 | FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416) | |
| International application No. PCT/GB 03/01598 | International filing date (day/month/year) 15.04.2003 | Priority date (day/month/year) 15.04.2002 |
| International Patent Classification (IPC) or both national classification and IPC H01L41/04 | | |
| Applicant PBT (IP) LIMITED et al. | | |

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| <p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 4 sheets, including this cover sheet.</p> <p><input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of 1 sheets.</p> |
| <p>3. This report contains indications relating to the following items:</p> <ul style="list-style-type: none"> I <input checked="" type="checkbox"/> Basis of the opinion II <input type="checkbox"/> Priority III <input checked="" type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability IV <input type="checkbox"/> Lack of unity of invention V <input type="checkbox"/> Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement VI <input type="checkbox"/> Certain documents cited VII <input type="checkbox"/> Certain defects in the international application VIII <input type="checkbox"/> Certain observations on the international application |

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| Date of submission of the demand 17.05.2004 | Date of completion of this report 02.08.2004 |
| Name and mailing address of the International preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465 | Authorized Officer Köpf, C Telephone No. +49 89 2399-2365 |



INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB 03/01598

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, Pages

1-3 as originally filed

Claims, Numbers

1-7 received on 16.07.2004 with letter of 14.07.2004

Drawings, Sheets

1/3-3/3 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- the language of publication of the international application (under Rule 48.3(b)).
- the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- contained in the international application in written form.
- filed together with the international application in computer readable form.
- furnished subsequently to this Authority in written form.
- furnished subsequently to this Authority in computer readable form.
- The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- the description, pages:
- the claims, Nos.:
- the drawings, sheets:

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5. This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

III. Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

1. The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:

- the entire international application,
- claims Nos. 1-7
 - because:
- the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (specify):
- the description, claims or drawings (*indicate particular elements below*) or said claims Nos. are so unclear that no meaningful opinion could be formed (specify):
- the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.
- no international search report has been established for the said claims Nos. 1-7

2. A meaningful international preliminary examination cannot be carried out due to the failure of the nucleotide and/or amino acid sequence listing to comply with the standard provided for in Annex C of the Administrative Instructions:

- the written form has not been furnished or does not comply with the Standard.
- the computer readable form has not been furnished or does not comply with the Standard.

**INTERNATIONAL PRELIMINARY
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Re Item III

No opinion with regard to novelty, inventive step, and industrial applicability of amended claims 1-7 is established since the subject matter of amended independent claim 1, i.e. a control circuit for a piezo ceramic actuator comprising voltage applying means being arranged to apply a reverse bias voltage to the actuator, has only been searched in combination with original claims 1 and 2, i.e. with a control circuit for a piezo ceramic actuator comprising H-bridge voltage applying means being arranged such that a linear charge is applied thus producing a linear displacement of the actuator, but not in its present scope.

Hence, amended claims 1-7 relate to an invention in respect of which no international search report has been established (cf. Rules 66.1(e) and 66.2(a)(vi) PCT).

CLAIMS:

1. A control circuit for controlling the operation of a piezo ceramic actuator comprising means for applying a voltage to the piezo ceramic actuator, 5 the means arranged such that a linear charge is applied to the piezo ceramic device 10 which in turn produces a linear displacement of the piezo ceramic device.
2. The control circuit according to claim 1, wherein the means for applying 10 a voltage includes an H-bridge.
3. The control circuit according to claim 2, wherein the H-bridge is provided with a plurality of switches arranged to charge and discharge the piezo ceramic device.
- 15 4. The control circuit according to claim 3, wherein the plurality of switches are transistor switches.
5. The control circuit according to claims 2, 3 or 4, wherein the H-bridge is 20 configured to apply a reverse bias voltage to the actuator.
6. The control circuit according to any of the preceding claims, further comprising means for generating a control signal indicative of the temperature of the actuator and means for altering the amount of voltage as a function of the 25 control signal.
7. A piezo ceramic actuator arrangement comprising a piezo ceramic actuator and a control circuit according to any one of the preceding claims.